



United States Forest
Department of Service
Agriculture

R-4

Reply To: 5100 Fire Management

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Subject: Fire Shelter Deployment; Lake Mountain Fire,
Salmon National Forest, July 4, 1985

To: Regional Forester

On July 4, 1985, 82 fire shelters were deployed on the Lake Mountain Fire, Salmon National Forest. During the week of November 4, a team consisting of Jim Sweeney, Dave Dahl, and Roy Keck met to review the sequence of events that led up to the fire shelter deployment, critique actions taken relative to the 10 Standard Fire Fighting Orders and the 13 Situations that Shout Watch Out, and develop recommended actions needed to preclude similiar deployments in the future.

We have completed this assignment. Enclosed for your review and action is our analysis and recommendations.

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Enclosure



**REPORT ON
FIRE SHELTER DEPLOYMENT**

**LAKE MOUNTAIN FIRE
7/4/85
SALMON NATIONAL FOREST**

**"A DEPLOYED FIRE SHELTER--IS THE
END RESULT OF AN EARLIER MISTAKE!"**

(a statement by an unknown Great American philosopher)

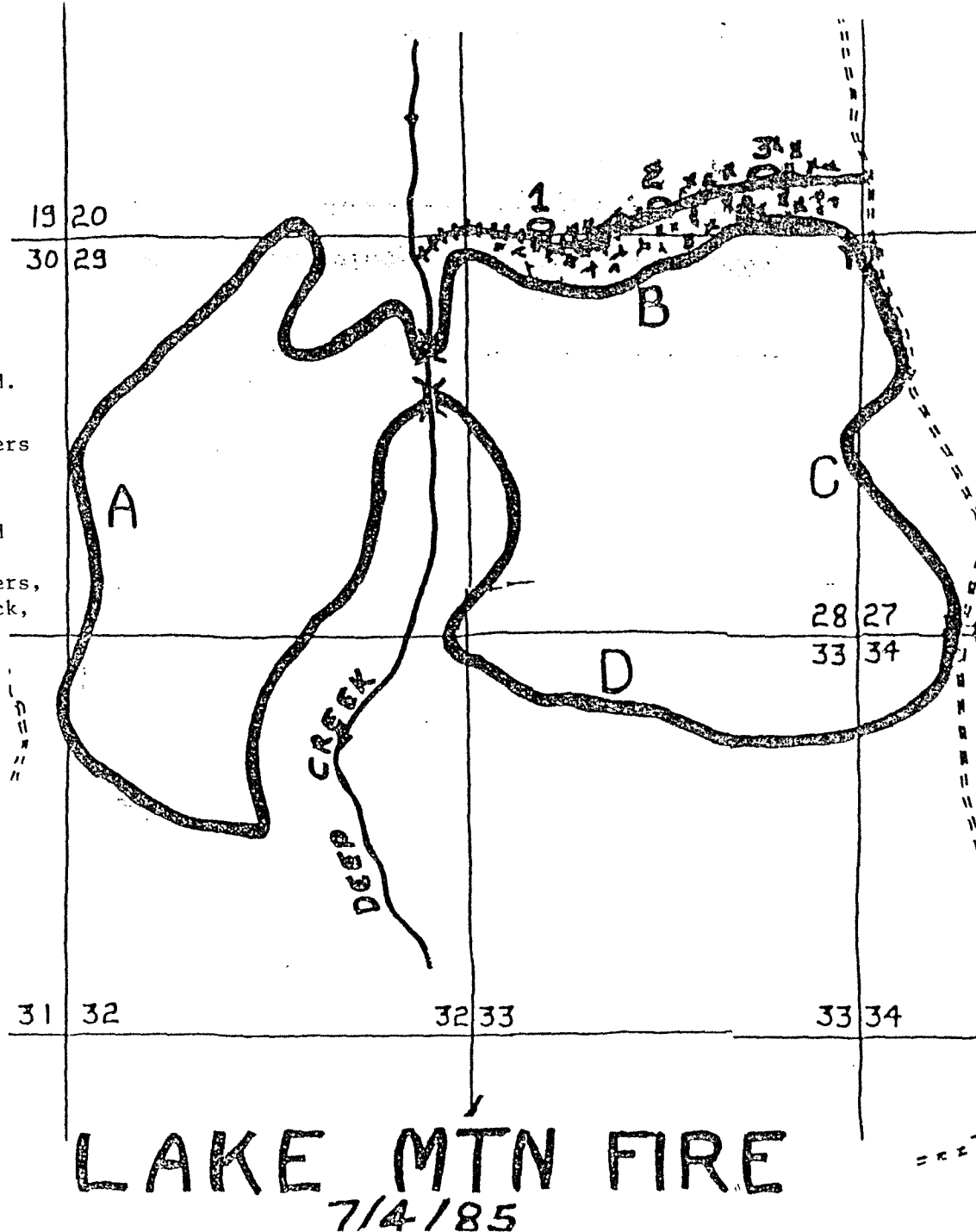
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LEGEND

- Path of major fire run
- XXXXX - Completed tractor line
- ||||| - Completed hand line
- XX
XXX - Spot fires and unburned islands
- 0¹ - Rock Slide - Division Supervisor and two crews took shelter - fire shelters not deployed.
- 0² - Rock Slide - Two crews and two fallers took shelter - fire shelters were deployed.
- 0³ - Dozed Safety Area - Strike Team Leader, two crews, one engine, and one tractor took shelter. Crews deployed fire shelters, engine crew stayed in truck, cat operator went under the cat.

NOTE: Only Division B features are shown for clarification.



II. SEQUENCE OF EVENTS THAT LED UP TO THE DEPLOYMENT OF 82 FIRE SHELTERS ON JULY 4, 1985, ON THE LAKE MOUNTAIN FIRE, SALMON NATIONAL FOREST:

1. Fire started on June 29, 1985.
2. Fire manned by a Class II team on June 30, 1985.
3. From June 30 to July 2, the fire stayed on the west side of Deep Creek. Prior to main burning period on July 2, fire was about 600 to 800 acres.
4. Fire behavior forecast for July 2 indicated potential spotting problems, flame length 10 to 12 feet, making direct attack impossible. Torching and spotting across creek (east side of Deep Creek) would still be probable all day. Reburn could have happened in afternoon.
5. Fire behavior forecast became a reality on July 2. Fire crossed Deep Creek and more than doubled in size. At that time, a Class I team was ordered.
6. Class I team took over the fire on July 3.
7. Fire weather and fire behavior predictions for July 3 were the same as for July 2, but with winds up to 25 mph.
8. Fire perimeter remained relatively stable throughout the day of July 3.
9. Fire weather forecast for July 4 called for southwesterly winds 6 to 10 mph in the afternoon with gusts to 14 mph. Southerly-facing slopes 8 to 12 mph with higher gusts to 20 mph. Chance of gusty winds to 30 mph if thunderstorms develop.
10. Safety plan for July 4 day shift, under fire behavior, cautioned that people continually watch for fire and weather indicators. Expect fire runs and spotting and plan accordingly.
11. The recognition for potential erratic extreme fire behavior was recognized as evidenced by construction of safe areas.
12. Indicators of pending erratic and extreme fire behavior were being observed by line personnel as early as 1400.

13. In the afternoon, decisions were made to try to hold the line using helicopter bucket drops.

14. From about 1400 to 1700, fire intensity increased. At about 1700, it was decided that line holding was not possible.

15. About 1700, crews moved to previously identified safe areas.

16. About 1730, four crews and two fallers deployed their shelters in two separate locations.

17. In a separate location on Division B, a tanker crew stayed in its vehicle, a cat skinner took cover under his Cat. Two overhead in this area did not deploy their shelters.

18. Personnel stayed sheltered up for about 2 hours; coming out about 1900 to 1930.

III. CRITIQUE OF ACTIONS TAKEN RELATIVE TO THE "10 STANDARD FIREFIGHTING ORDERS" AND THE "13 SITUATIONS THAT SHOUT WATCH OUT:"

10 STANDARD FIREFIGHTING ORDERS

1. "Keep informed on fire weather conditions and forecasts."

a. Fire weather forecaster was on the fire.

b. Appropriate personnel were informed.

2. "Know what your fire is doing, personally, at all times--observe personally, use scouts."

a. Operations Chief was airborne.

b. Each crew would periodically send out a scout to observe what the fire was doing. No permanently posted red-carded scouts or lookouts were used.

c. People on the line were able to observe (at least periodically) what was going on below them.

d. The fire started heating up and spotting on both Divisions A and B during the day. There was apparently no communications between Divisions A and B on what was occurring.

3. "Base all actions on current or expected behavior of fire."

Actions taken were not based on current or predicted fire behavior, but apparently on observed fire behavior from July 3 and "normal" fire behavior for that time of year.

4. "Have escape routes for everyone and make them known."

Escape routes were planned and known.

5. "Post a lookout when there is possible danger."

No lookout was posted.

6. "Be alert, keep calm, think clearly, act decisively."

During the emergency situation, this was done.

7. "Maintain prompt communication with your firefighters, your boss, and adjoining forces."

A communication capability appears to have been in place. Division B Strike Team Leader was not able to talk directly to his Division Chief for the bulk of the shift on July 4.

8. "Give clear instructions and be sure they are understood."

This was being done.

9. "Maintain control of your firefighters at all times."

This was done.

10. "Fight fire aggressively, but provide for safety first."

The fire was being aggressively fought. Safety was not being given the same intensity of attention.

FIRE SITUATIONS THAT SHOUT WATCH OUT

1. "You are building a fireline downhill toward a fire."

This was being done. Ample evidence exists that the hazards were well known and mitigated. This did not contribute to the fire shelter deployment.

2. "You are fighting fire on a hillside where rolling material can ignite a fire below you."

This was not a factor.

3. "You notice the wind begins to blow, increase, or change direction."

There is ample evidence that an increase of wind velocity was occurring. There is no indication of responsiveness to the consequences of this climatic change.

4. "You feel the weather getting hotter and dryer."

There was no physically detectable change.

5. "You are in heavy cover with unburned fuel between you and the fire."

There was unburned fuel below the constructed line.

6. "You are away from a burned area where terrain and/or cover makes travel difficult or slow."

Did not consider the burned area a safe zone. Safe zones were developed.

7. "You are in country you have not seen in the daylight."

Daytime indident.

8. "You are in an area where you are unfamiliar with local factors influencing fire behavior."

Overhead team was from outside the area and was not familiar with local factors. Salmon District BLM employee, who was Operations Section Chief on the Class II team from June 30 through July 2, stayed on as a local advisor to the Class I team.

9. "You are attempting a frontal assault on a fire with engines."

Not applicable to this fire.

10. "You are getting frequent spot fires over your line."

On Divisions A and B, spotting was occurring throughout the day of July 4. Intensity and frequency increased as the day progressed. About 1700, the crews recognized they had lost their lines and pulled back to the safety areas.

11. "You cannot see the main fire, and you are not in communication with anyone who can."

Not applicable.

12. "You have been given an assignment of instructions not clear to you."

The understanding of instructions appeared clear.

13. "You feel like taking a nap near the fireline."

Not applicable.

IV. CONCLUSIONS

1. Fire weather forecasts were site specific and within reasonable and acceptable ranges of that which subsequently occurred.
2. Fire behavior forecasts were generally accurate, but tended to lack strong emphasis considering the history of daily afternoon erratic fire behavior coupled with continued adverse weather conditions.
3. Potential for erratic, extreme, and dangerous fire behavior was recognized in shift plans for July 4; e.g., reference to spotting, safety zones, etc.
4. Potential intensity of fire behavior on July 4 was underestimated. This was possibly due to relatively quiet behavior that the fire team observed on July 3 with essentially the same weather forecast.
5. Calculations of probability for July 4 underestimated spread potential, resulting in line location being too close to main fire.
6. Downhill line construction was recognized as being a hazardous undertaking and cautionary procedures were discussed in briefing and shift plans.
7. Written Division assignments were skimpy in detailing work; e.g., anchor points and ensuring tie-in between Division A and Division B.
8. No mention of burning out or carrying a black line in shift plans for July 4.
9. Strongest emphasis in shift plans for all four Divisions was under Special Instructions, which said "bring out the garbage." This is a statement associated with winding down, an indication of a feeling that it's all over perhaps.
10. Completion of crew and/or Division assignment in Division B, based on predicted weather and fire behavior, had little or no chance of success.
11. Indications of impending erratic and extreme fire behavior were being observed by line personnel as early as 1400 hours on July 4.
12. Decisions were initially made by line overhead to try to hang on with air support by helicopter bucket work in spite of 11. above.
13. Lack of evidence of early tactical support with four available fixed wing airtankers.
14. Decisions made by individual Strike Team Leaders and Division Supervisor to move personnel on Division B into safety zones was sound.
15. Line overhead did a good job of controlling what could have turned into a full-blown panic situation at all locations where personnel took shelter.

V. SUMMARY

We were fortunate in this instance. Eighty-two fire shelters were deployed--one with two people in it. Another six people took shelter inside an engine, under a tractor, and behind an engine. No one suffered any injuries.

Adherence to the Ten Standard Orders and the Thirteen Watch Out Situations, coupled with the knowledge of the effects of weather, fuels, and topography on fire behavior, must be recognized and provided for in the execution of tactical plans. Had this been done, the deployment of the fire shelters would have been unnecessary.

The real damage from this incident can well occur on down the road. We must guard against the notion that fire shelters work so well, we can take chances. That they work so well, we can forget about the 10 Standard Orders and the 13 Watch Out Situations.

Fire shelters are nothing more than last-ditch protection of man against the consequences of man's own mistakes. Mistakes of a life-threatening nature in fire suppression are unnecessary, as well as inexcusable considering what is known about fire weather, fuels, topography, and resultant fire behavior.

VI. RECOMMENDATIONS

1. "Add to the 10 Standard Firefighting Orders one addressing the use of fire shelters." Suggested wording is: EXERCISE ALL AVAILABLE SAFETY PRECAUTIONS BEFORE FINALLY RESORTING TO USING FIRE SHELTERS.

Rationale: The use of fire shelters has evolved over the past decade. The firefighting communities recognition of the shelters effectiveness in saving lives from incidents such as this one is increasing. This could result in an unconscious willingness to take risks because "we have our fire shelters." Having fire shelters addressed in the 10 Standard Firefighting Orders will put a continual reemphasis on the intended purpose--to save lives when everything else has failed.

2. "Develop and implement a Regional fire shelter deployment incident reporting system."

Rationale: Every deployment of a fire shelter is the result of a failure somewhere which could have resulted in a fatality. We must develop a method of identifying these failures, evaluate them, and implement corrective action. At this time, we have no systematic method to identify these failures.

3. "Recommend a National fire shelter deployment incident reporting system."

Rationale: Firefighting forces are not restricted to Regional boundaries. The benefits from a Regional system would be increased expotentially if it was part of a National system.

4. "Develop a safety alert system to increase Regional awareness and reemphasis of 10 Standard Firefighting Orders and the 13 Situations That Shout Watch Out."

Rationale: Near misses from violating Standard Firefighting Orders or "Watch Out" Situations are given wide distribution when a multiple injury or fatality occurs. There is no system in place to communicate "near misses." Such a system would give a reemphasis to the 10 Standard Firefighting Orders and 13 "Watch Out" Situations.

5. "Reemphasize the overhead rating system already in place, especially related to:

- a. The importance of giving a valid rating.
- b. Followup of ratings showing the need for improvement.

Rationale: An important part of the National Interagency Fire Qualification System (NIFQS), in addition to experience and training, is the quality of work performed. The only way to measure this quality is through the use of SF 371, the Fire Overhead Performance Rating Form. It is the responsibility of the home unit supervisor to followup on any identified weakness and/or deficiency and make a final determination as to the firefighters red-card qualification. Often, this is only given cursory treatment at both levels, resulting in NIFQS qualifications are determined only by number of fires and training.

6. "Require Forest Supervisors to do an overhead rating form for each incident commander."

Rationale: There is no known requirement for an overhead rating for incident commanders. A specific analysis of performance by the Forest Supervisor would benefit both the incident commander and the wildland fire agencies.